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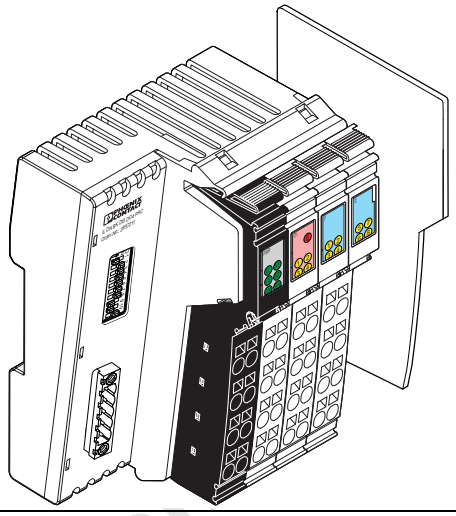
IL DN BK DI8 DO4-PAC

Inline Bus Coupler for DeviceNet™ With 8 Digital Inputs and 4 Digital Outputs



AUTOMATION

Data Sheet
7523_en_00

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1 Description

The IL DN BK DI8 DO4-PAC bus coupler is the interface between the DeviceNet™ and the Inline installation system.

With the help of a bus coupler, 63 Inline terminals can be connected at any position within an existing DeviceNet™ system. The bus coupler and the Inline terminals together build a station with 63 local bus devices. Here, the inputs and outputs of the bus coupler together form the first local bus device.

Module Features

- DeviceNet™ connection via TWIN COMBICON connector
- DIP switch to set the DeviceNet™ address
- Supported DeviceNet™ addresses 0 to 63
- Device description using EDS file
- 8 digital inputs
- 4 digital outputs
- Diagnostic and status indicators
- Automatic baud rate identification in the local bus (500 kbps or 2 Mbps)
- Connection of up to 63 I/O modules
- Can be installed in the field without software for automatic configuration of the station
- Digital inputs with latch function
- Stored (latched) diagnostic data
- Reservation of I/O memory area for future expansions possible (no hardware required)
- Supported Inline module types:
  Digital inputs and outputs
  Analog inputs and outputs
  Intelligent function modules

DeviceNet™ Features

- Faulted node recovery
- Baud rates:
  125 kBaud, 250 kBaud, 500 kBaud
- I/O slave messages:
  Polling, Cyclic, Change-of-State (COS), Bit strobing

This data sheet only is valid in connection with the IL SYS INST UM E user manual (see "Ordering Data" on page 2).

Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf.

This data sheet is valid for all products listed on the following page:

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2 Ordering Data

Product

Description	Type	Order No.	Pcs./Pkt
Inline bus coupler for DeviceNet™ with 8 digital inputs and 4 digital outputs including accessories (end plate, connector and labeling fields)	IL DN BK DI8 DO4-PAC	2897211	1

Accessories

Description	Type	Order No.	Pcs./Pkt
DeviceNet™ connector	TMSTBP 2,5/ 5-STF-5,08 GNAU CP	2862576	1
Connector set as replacement item	IL BKDIO-PLSET	2878599	1
Extended double signal connector for inputs, 4 signals with 3-wire connection method	IB IL SCN-12-ICP	2727611	10
Extended double signal connector for outputs, 4 signals with 3-wire connection method	IB IL SCN-12-OCP	2727624	10
Keying profile	IL CP	2742683	100
Zack marker strip to label the terminals	ZB 6 ... see CLIPLINE catalog	1051003	10
Zack marker strip to label the terminals	ZB 12 ... see CLIPLINE catalog	0812120	10
DIN EN 50022 rail, 2 meters	NS 35/7,5 PERFORATED NS 35/7,5 UNPERFORATED	0801733 0801681	1 1
End clamp	CLIPFIX 35-5	3022276	50

Documentation

Description	Type	Order No.	Pcs./Pkt
User Manual: "IL DN BK DI8 DO4-PAC Bus Coupler"	UM EN IL DN BK DI8 DO4-PAC	2910334	1
Application Note: "I/O Modules at Bus Couplers"	AH IL BK IO LIST	9015358	1
User Manual: "Automation Terminals of the Inline Product Range"	IL SYS INST UM E	2698737	1

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3 Technical Data

General Data	
Housing dimensions (width x height x depth)	80 mm x 121 mm x 70 mm
Weight	255 g (with connectors)
Ambient temperatures (operation)	-25°C to +60°C
Ambient temperature (storage/transport)	-25°C to +85°C
Permissible humidity (operation/storage/transport)	10% to 95%, according to EN 61131-2
Permissible air pressure (operation/storage/transport)	70 kPa to 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20 according to IEC 60529
Class of protection	Class 3 in acc. with VDE 0106, IEC 60536
Connection data for Inline connectors	
Connection type	Spring-cage terminals
Conductor cross-section	0.2 mm^2 to 1.5 mm^2 (solid or stranded), 24 - 16 AWG

DeviceNet™ System Data	
Transmission speed	500 kbps, 250 kbps, 125 kbps
Transmission reliability	CR check
Maximum transmission distance	Up to 500 m (depends on transmission speed)
Protocols	Control and information (**C**ommon **I**ndustrial **P**rotocol) with CAN as transport medium
Nodes	64, max.
Voltage range of the bus coupler (+V, -V)	11 V - 25 V
Nominal current of the bus coupler (+V, -V)	60 mA
Bus coupler certification	ODVA

System Limits of Bus Coupler	
Transmission rate on the local bus	500 kbps or 2 Mbps (automatic detection)
Number of I/O devices within an Inline system	63, max.
Maximum number of process data	Limited by Class-Instance maximums Observe the 2 byte status data of the bus coupler.
Maximum number of PCP devices	8
Maximum power supply at U_L (7.5 V)	0.8 A, max.
Maximum power supply at U_{ANA}	0.5 A, max.
Maximum power supply at U_S	8 A, max. (total current with U_M)
Maximum power supply at U_M	8 A, max. (total current with U_S)
Maximum current consumption of the I/O terminals	See terminal-specific data sheet

Observe the current consumption of each device when configuring an Inline station. The current consumption is indicated in each terminal-specific data sheet. The current consumption can differ depending on the individual terminal. If the maximum current capacity of a power supply is reached, a new power terminal must be used.

DeviceNet™ Interface
CAN bus, connected via TWIN COMBICON connector

Common Data for 24 V Supply U_L, U_S, U_M	
Connection	Via power connector; for terminal point assignment see page 10
Connection method	Spring-cage terminals
Recommended cable lengths	30 m, max.; routing cables through outdoor areas is not admissible
Continued	Via potential routing
Nominal value	24 V DC
Tolerance	-15%/+20% (according to EN 61131-2)
Ripple	± 5%
Permissible range (according to EN 61131-2)	19.2 V to 30 V

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Common Data for 24 V Supply U_L, U_S, U_M (Continued)

Safety equipment	
Surge voltage, polarity reversal	Yes, suppressor diode parallel to supply voltage

NOTE: The bus coppler is damaged in the event of overload

The 24 V area must be protected externally. The power supply unit must be able to supply 4 times the nominal current of the external fuse, to ensure that it trips in the event of an error. Recommended fuse 4 A medium blow.

U_L (7.5 V) and U_{ANA} (24 V) are generated from U_L (24 V).

Current Consumption / Power Consumption

Current consumption from U_{LOGIC} (24 V)	
Current consumption local bus (800 mA load at 7.5 V)	0.4 A, max.
Current consumption from U_{ANALOG} (24 V)	0.5 A, max.
Current consumption from U_{LOGIC} total	0.9 A, max.
Current consumption from U_S (24 V)	8 A, max.
Current consumption from U_M (24 V)	8 A, max.
Power dissipation entire device	3.5 W, max.

Digital Outputs

Number	4
Connection method for actuators	2 and 3-wire technology
Nominal output voltage U_{OUT}	24 V DC
Differential voltage for I_{nom}	< 1 V
Nominal current I_{nom} per channel	0.5 A
Total current	2 A
Nominal load	
Ohmic	12 W
Lamp	12 W
Inductive	12 VA (1.2 H)
Switching frequency with nominal inductive load	0.5 Hz (1.2 H), maximum
Response time	1.2 ms, typical
Overload response	Auto restart
Response with inductive overload	Output may be damaged
Reverse voltage protection against short pulses	Protected against reverse voltages
Resistance to permanently applied reverse voltages	Protected against reverse voltages, permissible current 2A, maximum
Response upon power down	The output follows the supply voltage without delay
Limitation of the voltage induced on circuit interruption	-30.0 V, approximately
Safety equipment	Short circuit; overload
Type of safety equipment	Integrated free running circuit in the output chip
Maximum output current when switched off	10 µA
Error message to the higher-level control system	Short circuit; overload

When not loaded, a voltage can be measured even at an output that is not set.

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Digital Inputs

Number	8
Connection method for sensors	2 and 3-wire technology
Input design	According to EN 61131-2, type 1
Switching threshold definition	
Maximum low-level voltage	U_{Lmax} < 5 V
Minimum high-level voltage	U_{Hmin} > 15 V
Common potentials	Sensor supply U_S, ground
Nominal input voltage U_{IN}	24 V DC
Permissible range	-30 V < U_{IN} < +30 V DC
Nominal input current for U_{IN}	3 mA, typical
Current flow	Limited to a 3 mA, maximum
Delay time	1.2 ms, typical
Permissible cable length to the sensor	100 m
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application
Safety equipment	Polarity reversal
Type of safety equipment	Serial diode for polarity reversal protection
Error message to the higher-level control system	Sensor supply not present

Mechanical Requirements

Vibration test sinusoidal vibrations according to IEC 60068-2-6; EN 60068-2-6	5g load, 2 hours in each space direction
Shock test according to IEC 60068-2-27; EN 60068-2-27	25 g load for 11 ms, half sinusoidal wave, 3 shocks in each space direction and orientation

Conformance With EMC Directive 89/336/EEC or 2004/108/EG

Noise Immunity Test According to EN 61000-6-2

Electrostatic discharge (ESD)	EN 61000-4-2/ IEC 61000-4-2	Criterion B 6 kV contact discharge 8 kV air discharge
Electromagnetic fields	EN 61000-4-3 IEC 61000-4-3	Criterion A Field strength: 10 V/m
Fast transients (burst)	EN 61000-4-4/ IEC 61000-4-4	Criterion A All interfaces: 1 kV Criterion B All interfaces: 2 kV
Surge voltage	EN 61000-4-5/ IEC 61000-4-5	Criterion B Supply cables DC: 0.5 kV / 1 kV (symmetrical/asymmetrical) fieldbus cable shield 1 kV
Conducted interference	EN 61000-4-6 IEC 61000-4-6	Criterion A Test voltage 10 V

Noise Emission Test According to EN 61000-6-4

Noise emission of housing	EN 55011	Class A

Approvals

Information on latest approvals can be found on the Internet at www.download.phoenixcontact.com or www.eshop.phoenixcontact.com.

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4 Local Diagnostic and Status Indicators

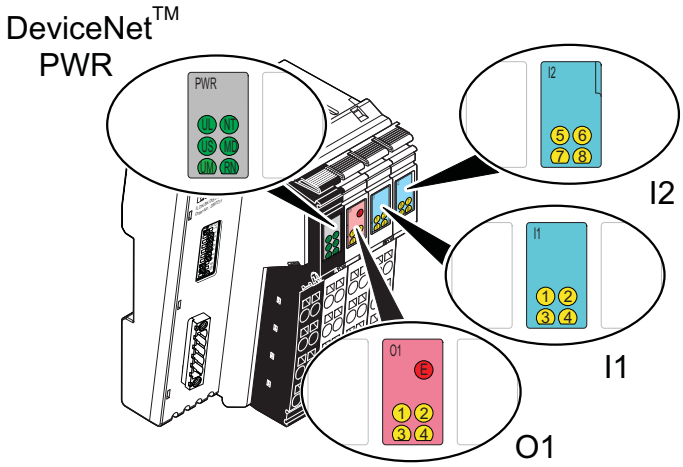

Figure 1 Displays on the bus coupler

LED	Color	Meaning	State	Description of the LED States
PWR, DeviceNet™				
UL	Green	U_{Logic}	ON	24 V bus coupler supply / 7.5 logic voltage is present (U_{Logic})
			OFF	24 V bus coupler supply / 7.5 logic voltage is not present
US	Green	$U_{Segment}$	ON	24 V supply of the segment circuit ($U_{Segment}$) is present
			OFF	24 V supply of the segment circuit is not present
UM	Green	U_{Main}	ON	24 V supply of the main circuit (U_{Main}) is present
			OFF	24 V supply of the main circuit is not present
NT	Green/ red	**Net**work status		Network status
			Green ON	Device is online and has established a connection Group 2 devices are assigned to a master
			Red ON	Error preventing communication with the network (e.g., bus is offline or duplicate MAC ID).
			Green flashing	Device online, connections not established. Device has finished the "duplicate MAC ID" test but has not established connections to other nodes. Group 2 devices are **not** assigned to a master.
			Red flashing	One or more connections are in the timeout state
			Red-green flashing	Network access error
			OFF	Device not online The device has not yet finished the "duplicate MAC ID" test. The device is not supplied with voltage.

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LED	Color	Meaning	State	Description of the LED States
MD	Green/ red			Device status (**M**odule **D**iagnostics)
			Green ON	Normal operation
			Red ON	Unrecoverable error
			Green flashing	– Device not configured, or device configuration not complete or faulty. – Device in standby mode
			Red flashing	Recoverable error
			Red-green flashing	Selftest
			OFF	No supply voltage
RN	Green	**R**u**n**		Status of the local Inline communication
			Green ON	Local bus communication present
			Green flashing 10 Hz	Initialization phase
			1 x Green flashing	"Module Change" alarm during startup
			2 x Green flashing	Connection error
			Green flashing 20 Hz	Loop diagnostics (e.g., for connected FLM or AS-i modules)
			3 x Green flashing	"Module Change" alarm during operation
			Green flashing 1 Hz	Configuration error (without other error)
			4 x Green flashing	Operation with error data
			Green flashing 2 Hz	Peripheral fault (without other errors)
			5 x Green flashing	Error of supply voltage
			OFF	The bus coupler only operates with integrated inputs and outputs. No other Inline terminals are snapped on.
O1				
E	Red	**E**rror	ON	Peripheral fault present, short-circuit or overload at one of the outputs
			OFF	No short circuit or overload at one of the outputs
1 - 4	Yellow	Output **1** to Output **4**		Status indicators of the outputs
			ON	Output active
			OFF	Output not active
I1, I2				
E	Red	**E**rror	ON	Peripheral fault present, short circuit or overload of the sensor supply
			OFF	No short circuit or overload of the sensor supply
1 - 8	Yellow	Input **1** to Input **8**		Status indicators of the inputs
			ON	Input active
			OFF	Input not active

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5 Circuit Diagram

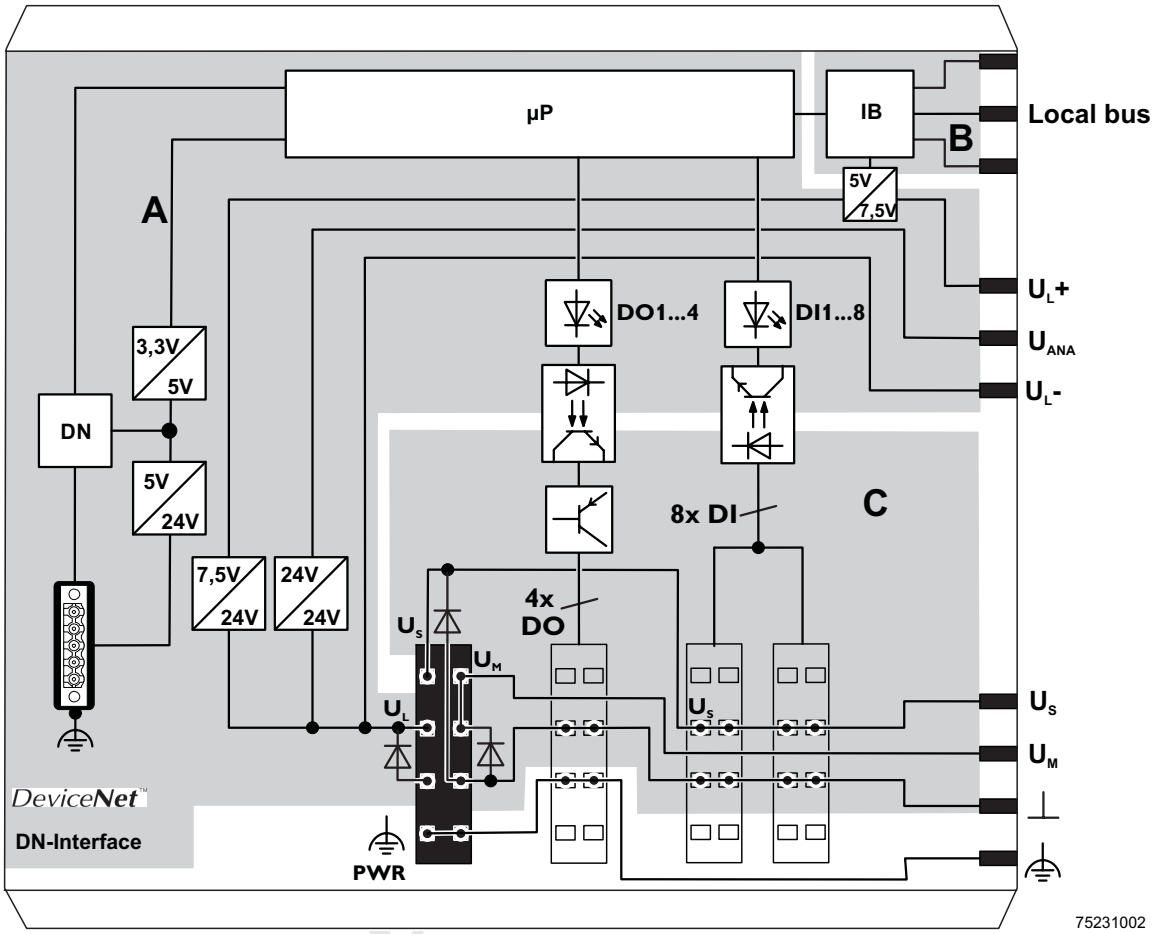

Figure 2 Circuit diagram of the bus coupler

Key:

DN Protocol chip

µP Microprocessor

IB Protocol chip

Optocoupler

Supply unit with electrical isolation

PNP transistor

Gray circuit diagram areas represent the electrically isolated areas:

A: DeviceNet™ interface / Logic
B: Inline Interface
C: I/O devices

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6 Setting the Address and the Baud Rate

Configure the hardware on the module using the 10-pos. DIP switch. This switch can be used to set the DeviceNet™ address and the baud rate. The functions of the individual switches are listed in the following tables.

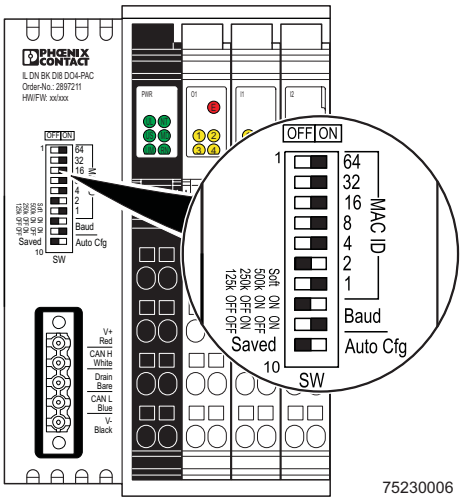

Figure 3 Module DIP switches

6.1 Address Setting Using DIP Switches 1 to 7 (MAC ID)

DIP switches 1 to 7 are used to set the device address (MAC ID). Here, DIP switch 1 (SW1) is the most significant digit of the MAC ID (MSB = Most Significant Bit) and DIP switch 7 (SW7) is the least significant digit of the MAC ID (LSB = Least Significant Bit).

	SW1	SW2	SW3	SW4	SW5	SW6	SW7
ON	64	32	16	8	4	2	1
OFF	0	0	0	0	0	0	0

6.2 Valid MAC ID settings are in the range from 0 to 63.

Switch the power off and back on to accept the address changes.

6.3 Baud Rate Settings Using DIP Switches 8 and 9 (Baud)

The DeviceNet™ transmission speed is set via DIP switches 8 (SW8) and 9 (SW9). The following table shows the switch settings for different baud rates.

SW8	SW9	Baud Rate
ON	**ON**	Can be adjusted using the software.
ON	**OFF**	500 kbaud
OFF	**ON**	250 kbaud
OFF	**OFF**	125 kbaud

Switch the voltage on and off to accept baud rate changes.

Configuration of DIP Switch 10

With DIP switch 10, the I/O configuration mode of the bus coupler is set.

ON enables the bus coupler to auto-configure the I/O modules during the next power-up (**Auto Cfg**).

With **OFF**, the bus coupler retains the last valid I/O module configuration (**Saved**).

For further information on the configuration, please refer to section "Configuration of the Bus Coupler Using the DIP Switches" on page 11.

Restoring Factory Default Settings

Switch off the voltage supply. Set DIP switches 1 to 7 to the ON position. Connect the power supply to the bus coupler. This restores the factory default settings.

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7 Connection DeviceNet™, Supply, Actuators and Sensors

7.1 Connecting DeviceNet™

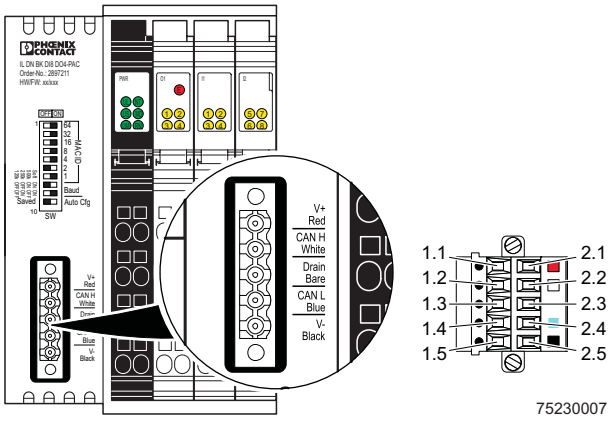

Figure 4 Pin assignment of the TWIN COMBICON connector

Connect DeviceNet™ via the TWIN COMBICON connector to the bus coupler. For the pin assignment, please refer to the following table:

Pin	Color	Signal	Description
1.1, 2.1	Red	V+	+24 V DC for U_L
1.2, 2.2	White	CAN H	CAN High
1.3, 2.3	Blank	Drain	Shield
1.4, 2.4	Blue	CAN L	CAN Low
1.5, 2.5	Black	V-	GND

Install a termination resistor (121 Ω / 0.25 W with 1% tolerance) within the DeviceNet™ system at each end of the main cable.

7.2 Connection of Supply, Actuators and Sensors

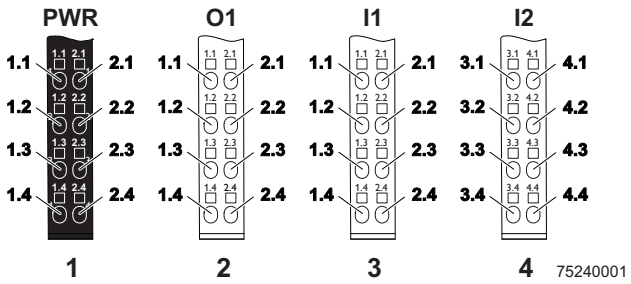

Figure 5 Terminal point assignment of the Inline connectors

Terminal Point Assignment of the Power Connector (1)

Terminal Points	Assignment	Terminal Points	Assignment
1.1	U_S	2.1	U_M
1.2	U_L	2.2	U_M
1.3	GND U_L	2.3	GND U_M, U_S
1.4	Functional earth ground (FE)	2.4	Functional earth ground (FE)

Terminal Point Assignment of the Output Connector (2)

Terminal Points	Assignment	Terminal Points	Assignment
1.1	OUT1	2.1	OUT2
1.2	PGND	2.2	PGND
1.3	FE	2.3	FE
1.4	OUT3	2.4	OUT4

Terminal Point Assignment of the Input Connector (3)

Terminal Points	Assignment	Terminal Points	Assignment
1.1	IN1	2.1	IN2
1.2	U_S	2.2	U_S
1.3	PGND	2.3	PGND
1.4	IN3	2.4	IN4

Terminal Point Assignment of the Input Connector (4)

Terminal Points	Assignment	Terminal Points	Assignment
3.1	IN5	4.1	IN6
3.2	U_S	4.2	U_S
3.3	PGND	4.3	PGND
3.4	IN7	4.4	IN8

For notes on the voltage supplies please refer to the IL SYS INST UM E user manual.

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7.3 Connection Example

Connect the bus coupler according to Figure 6.

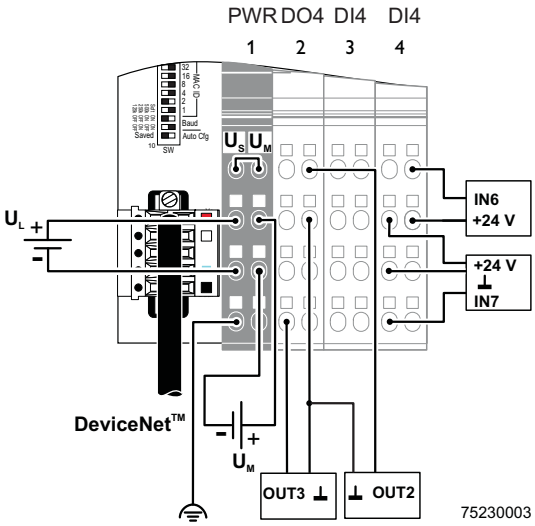

Figure 6 Connection example

8 Configuration of the Bus Coupler Using the DIP Switches

Auto-configuration using the DIP switches enables the bus coupler to be configured "in the field" without software. This includes the following standard settings:

– The Inline status word is added by the first two bytes within the produced response.
– All digital, analog, and function modules are added to the produced response and/or the consumed request.

Procedure for Auto-Configuration

For auto-configuration, proceed as follows:

1 Set the device address and the baud rate using DIP switches 1 to 9.
2 Set DIP switch 10 to "ON".
3 Switch on the bus coupler (DeviceNet™ supply and U_L) with the required I/O modules. If the MD and RN LEDs on the bus coupler are permanently on (green), the I/O configuration is saved in the bus coupler's flash memory.
4 Set DIP switch 10 to "OFF". This means that auto-configuration is disabled on the next power up and ensures that the same active configuration is used on the next power up.

For further information on the configuration options, please refer to the UM EN IL DN BK DI8 DO4-PAC user manual.

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9 Explanations Regarding the I/O Memory Mapping

For further information on the I/O memory mapping, please refer to the UM EN IL DN BK DI8 DO4-PAC user manual.

The Inline status word that is contained in the produced data per default, can be mapped in the memory image. In addition to the Inline status word, the input memory image can contain input data for digital and analog input modules as well as for function modules.

The control byte, which is not included by default, is mapped to the output memory image. In addition to the control byte, the output memory image can contain output data for digital and analog output devices as well as function modules.

The I/O mapping order is determined by the type and position of the I/O module. The modules next to the bus coupler are mapped first. First, the digital points are mapped, then the analog channels and function modules are mapped, independent of their physical position within the Inline station. The analog channels are mapped before the function data words.

If the produced data contain diagnostic status data, such as the Inline status word, this data type is shown in the input image before the digital data, analog data or function input data. If the consumed data contains the command byte, the command byte appears before the digital, analog, and function output data in the output data image.

If the overall number of digital points of the same image is not 8, unused bits are present between the digital and analog (or function) data area.

The start of analog data on an even or uneven byte depends on the I/O modules that are connected to the bus coupler. When starting on an odd byte, analog data in the master scanner could comprise two words. If the analog data is to start on an even byte, the "Pad I/O" optional I/O fill function can be enabled. In this way, analog and function data start on an even byte boundary. This function can be enabled by an EDS file or by sending an explicit message. The "Pad I/O" option is enabled by default.

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Example I/O Data Table (Memory Image)

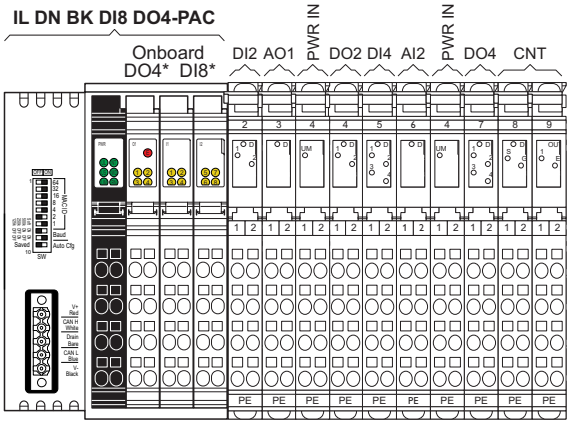
For further information on the I/O data table, please refer to the
UM EN IL DN BK DI8 DO4-PAC user manual.

Figure 7 shows a typical memory image for mixed I/O module configurations.

There are a total number of 11 input bytes (including the Inline status word) and a total number of 7 output bytes.

The example consists of the following I/O modules:

– Inline terminal with 2 digital inputs (DI 2)
– Inline terminal with an analog output (AO 1)
– Inline terminal with 2 digital outputs (DO 2)
– Inline terminal with 4 digital inputs (DI 4)
– Inline terminal with 2 analog inputs (AI 2)
– Inline terminal with 4 digital outputs (DO 4)
– Inline counter terminal (CNT)
– Inline supply terminals



I/O Data Tables (As seen by the master)

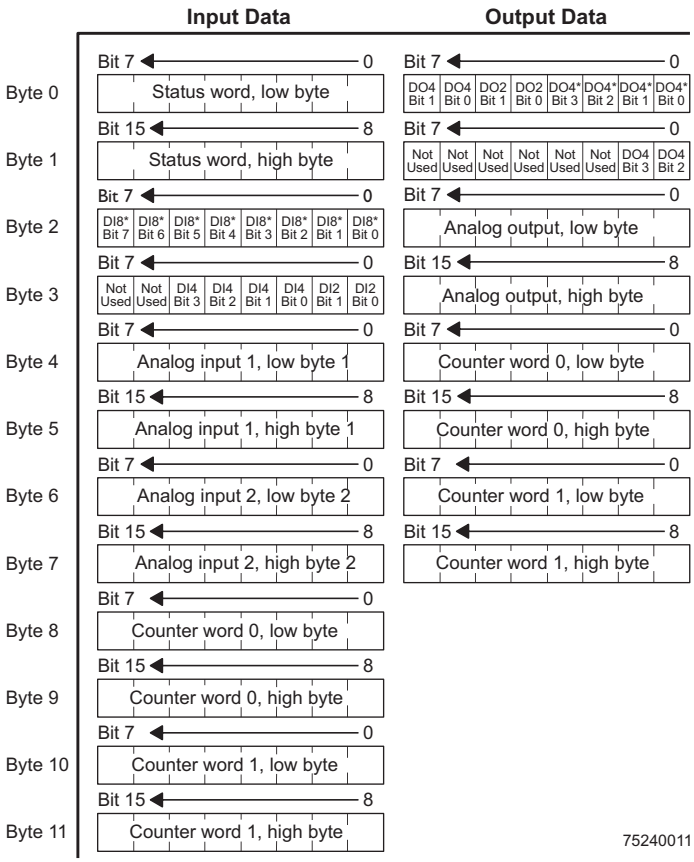


Figure 7 Typical I/O data table

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10 Diagnostics

Diagnostic Indicators (LEDs)

For the diagnostic indicators, please refer to section "Local Diagnostic and Status Indicators" on page 6.

Diagnostic Objects

For further information on diagnostics, please refer to the UM EN IL DN BK DI8 DO4-PAC user manual.

The diagnostic information is available via mapped attributes from the Configuration Object, Class Code 100_{dec} (64_{hex}).

In the pre-setting, the Inline diagnostic data (Inline status word) is available to the user. The diagnostic data starts in byte 0 of the data field input area and comprises 2 bytes, see Figure 7.

For standard mapping, the first byte contains the Inline error code and the second byte contains the number of the first erroneous I/O module in the Inline station.

Inline Status, Byte 0

Bit 7	Free
Bit 6	Outputs set in the DeviceNet™ error states
Bit 5	Module connection error
Bit 4	Configuration error (peripheral configuration not possible)
Bit 3	Module change error
Bit 2	Supply error
Bit 1	I/O error
Bit 0	CRC error

Inline Status, Byte 1

The device number in this byte stands for the position in the Inline station where the error or the warning occurred. The positions are enumerated and start at
IL DN BK DI8 DO4-PAC with 1. The numbering increments in physical order from left to right up to 64. This is the maximum number of devices that can be connected to an Inline station (63 I/O devices and 1 bus coupler).

11 Inline Fault Control System

Fault Response Mode

Fault response mode is a configurable setting that will control the behavior of the outputs of an Inline station, if one of the following three errors occurs:

– Module change error (bit 3 in Inline status word)
– Configuration error (bit 4 in the Inline status word)
– Module connection error (bit 5 in Inline status word)

The bus coupler has the ability to run in the fault response modes 0 to 3. The mode can be set by sending an explicit message or by selecting the mode in the fault response parameter in the EDS file.

Fault Response, Mode 0: Stop on Fault (Default)

Outputs are turned OFF automatically when a local failure occurs. Once the failure(s) is fixed, either a reconfiguration (Class 64_{hex}, Instance 1, Attribute 7) or a power cycle (U_L and DeviceNet™ power) needs to occur before the station becomes operational again.

Fault Response, Mode 1: Auto Restart

Outputs are turned OFF automatically when a local failure occurs. Once failure is fixed, the station will begin to update I/O automatically.

Fault Response, Mode 2: Set to the error state (Go to Fault State)

Outputs are turned OFF automatically for up to two seconds when a local failure occurs. After two seconds the station will attempt to set the outputs to the pre-programed DeviceNet™ fault states. The station will not recover its lost I/O, even after the fault condition has been cleared, without a reconfiguration or power cycle (U_L, DeviceNet™). The default for a preprogrammed fault state is OFF.

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Fault Response, Mode 3: Continue on Fault

Outputs are turned OFF automatically for up to two seconds when a local failure occurs. After two seconds the station will continue to update all I/O that is still on line. The station will not recover its lost I/O, even after the fault condition is cleared, without a reconfiguration or power cycle (U_L, DeviceNet™).

DeviceNet™ Attributes "Fault State" and "Fault Value"

The bus coupler supports the standard DeviceNet™ attributes "Fault State" and "Fault Value" for digital and analog outputs. This means that every output instance can be configured so that it is set to the pre-programmed state and value in the event of a DeviceNet™ communication error. Pre-programming is carried out using an explicit message and is saved in the flash memory. The states include:

- Hold last state/value
- Switch off (lower limit value for analog outputs)
- Switch on (upper limit value for analog outputs)
- Specified value (analog outputs)

12 DeviceNet™ Class Services and Object Classes

For more detailed information, please refer to the UM EN IL DN BK DI8 DO4-PAC user manual.

Supports DeviceNet™ Class Services

Service Code		Service Name
dec	hex	
05	05	Reset
14	0E	Get_Attribute_Single
16	10	Set_Attribute_Single

Supports DeviceNet™ Object Classes

Class Code		Object Type
dec	hex	
01	01	Identity Object
02	02	Router Object
03	03	DeviceNet Object
05	05	Connection Object
08	08	Digital Input Point Object
09	09	Digital Output Point Object
10	0A	Analog Input Point Object
11	0B	Analog Output Point Object
43	2D	Acknowledge Handler Object
100	64	Configuration Object
101	65	Inline Interface Object
102	66	Inline Module Object
103	67	Inline Special Function Object
104	68	COS Mask Object
105	69	PCP Special Function Object
106	70	Serial Communications Object

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13 Information About Networking

DeviceNet™ has a linear bus topology, see Figure 8. Termination resistors are required at each end of the trunk line. The branches from the trunk or branch line have a maximum length of 6 m. Each branch supports one or more devices. The total length of trunk and branch lines in the network depends on the line type and/or the baud rate.

The maximum cable length in the network according to the data rate is listed in the table below. For further details on cable lengths in the network in relation to the current supply, please refer to the DeviceNet™ specification.

Trunk Line

The trunk line is used to connect the individual devices and branches, and thus forms a network, see Figure 8. The trunk line is used if no branches are required. If branches are required, taps must be installed at the connection point for the branch line and trunk line. The maximum number of devices in the DeviceNet™ network is limited to 64.

Branch Line

A branch line is used to connect devices in the branches to the trunk line, see Figure 8. They are connected using a network tap. A branch line is usually thinner and more flexible than a trunk line and has a lower current carrying capacity.

Termination Resistors

To reduce undesired reflections and to ensure stable communication, termination resistors must be installed at the extreme ends of the trunk line (including branches), see Figure 8. For a DeviceNet™ trunk line, the required metal film termination resistor has a value of 121 Ohm with a tolerance of 1% and a power dissipation of 0.25 W. Termination resistors are not supplied as standard with the bus coupler.

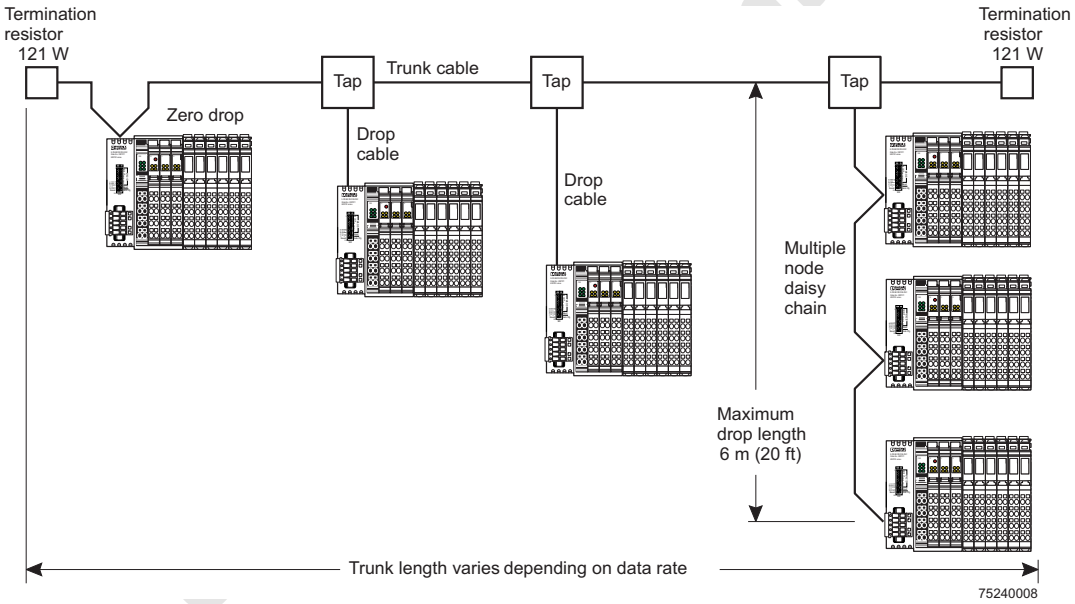

Figure 8 Typical DeviceNet™ bus topology

Maximum Cable Length

Baud Rate	DIP Switch Settings for Baud Rate	Length of the Trunk Line		Length of the Branch	
		Thick	Thin	Maximum	Cumulative
125 kbaud	8 OFF, 9 OFF	500 m	100 m	6 m	156 m
250 kbaud	8 OFF, 9 ON	250 m	100 m	6 m	78 m
500 kbaud	8 ON, 9 OFF	100 m	6 m	6 m	39 m